

CLAIMS

1. A method for improving the performance of a radio system by interleaving and de-interleaving symbol blocks including bits, comprising:
combining rectangular interleaving and diagonal interleaving,
5 selecting the interleaving depth and the type of interleaving method specifically for each symbol block,
signalling the interleaving depth and the interleaving method type of the symbol blocks to a receiver in order to remove the interleaving, and
removing the interleaving of the symbol blocks using de-interleaving
10 in the receiver.
2. A method as claimed in claim 1 wherein the information concerning the interleaving depth and interleaving method type is signalled to the receiver as a part of a sub-block.
3. A method as claimed in claim 1 wherein the information
15 concerning the interleaving depth and interleaving method type is signalled to the receiver in a separate information block.
4. A method as claimed in claim 1 wherein the information concerning the interleaving depth and interleaving method type is signalled to the receiver using a separate signalling channel.
- 20 5. A method as claimed in any one of preceding claims wherein the interleaving depth and interleaving method type are selected according to the quality of the symbol block load.
6. A method as claimed in any one of preceding claims wherein the interleaving depth and interleaving method type are changed on the basis of
25 the measurements carried out on the transmission channel.
7. A method as claimed in any one of preceding claims wherein the interleaving depth and interleaving method type are changed on the basis of a coding method.
8. A method as claimed in any one of preceding claims wherein the
30 interleaving depth and interleaving method type are changed during retransmission of packet-mode data.
9. A method as claimed in any one of preceding claims wherein the interleaving depth and interleaving method type are selected so as to provide a changing point for an interleaving set, when all the symbol blocks are entirely

sent, whose transmission is initiated before said changing point of the interleaving set.

10. A method as claimed in claim 9 wherein a modulation method is changed at the provided changing point of the interleaving set.

5 11. A method as claimed in claim 9 wherein a transmission turn is transferred to a second transmitter at the provided changing point of the interleaving set.

12. A method as claimed in claim 9 wherein a receiver of the transmission is changed at provided the changing point of the interleaving set.

10 13. A method as claimed in claim 12 wherein the receiver of the transmission is selected by directing the antenna beams of the receiver.

14. A method as claimed in claim 12 wherein transmission power is adjusted when the receiver of the transmission changes.

15 15. A radio system in which symbol blocks including bits are interleaved and de-interleaved in order to improve the performance of the radio system, comprising:

a transmitter comprises means for combining rectangular interleaving and diagonal interleaving,

20 the transmitter comprises means for selecting the interleaving depth and the type of interleaving method specifically for each symbol block,

the transmitter comprises means for signalling the symbol block-specific interleaving depth and interleaving method type to a receiver in order to remove the interleaving, and

25 the receiver comprises means for removing the symbol block interleaving using de-interleaving.

16. A system as claimed in claim 15 wherein the transmitter comprises means for signalling data concerning the interleaving depth and interleaving method type to the receiver as a part of a sub-block.

30 17. A system as claimed in claim 15 wherein the transmitter comprises the means for signalling the data concerning the interleaving depth and interleaving method type to the receiver in a separate information block.

18. A system as claimed in claim 15 wherein the transmitter comprises the means for signalling the data concerning the interleaving depth and interleaving method type to the receiver on a separate signalling channel.

19. A system as claimed in any one of preceding claims wherein the transmitter comprises means for selecting the interleaving depth and interleaving method type according to the quality of the symbol block load.

5 20. A system as claimed in any one of preceding claims wherein the transmitter comprises the means for changing the interleaving depth and interleaving method type on the basis of the measurements carried out on the transmission channel.

10 21. A system as claimed in any one of preceding claims wherein the transmitter comprises the means for changing the interleaving depth and interleaving method type on the basis of a coding method.

22. A system as claimed in any one of preceding claims wherein the transmitter comprises means for changing the interleaving depth and interleaving method type during retransmission of packet-mode data.

15 23. A system as claimed in any one of preceding claims wherein the transmitter comprises the means for selecting the interleaving depth and interleaving method type so as to provide a changing point for the interleaving set, when all the symbol blocks are entirely sent whose transmission is initiated before said changing point of the interleaving set.

20 24. A system as claimed in claim 23 wherein the transmitter comprises means for changing a modulation method at the provided changing point of the interleaving set.

25 25. A system as claimed in claim 23 wherein the transmitter comprises the means for creating the changing point of the interleaving set in the beginning or at the end of a transmission turn.

26. A system as claimed in claim 23 wherein the transmitter comprises means for changing the receiver of the transmission at the provided changing point of the interleaving set.

30 27. A system as claimed in claim 26 wherein the transmitter comprises the means for changing the receiver by directing the antenna beams of the transmitter.

28. A system as claimed in claim 26 wherein the transmitter comprises the means for adjusting transmission power when the receiver of the transmission is changed.

35 29. A radio transmitter in which symbol blocks including bits are interleaved in order to improve the performance of a radio system, comprising

means for combining rectangular interleaving and diagonal interleaving,

means for selecting the interleaving depth and the type of interleaving method specifically for each symbol block, and

5 means for signalling the symbol block-specific interleaving depth and interleaving method type to the receiver in order to remove the interleaving.

10 30. A transmitter as claimed in claim 29 wherein the transmitter comprises the means for signalling data concerning the interleaving depth and interleaving method type to the receiver as a part of a sub-block.

31. A transmitter as claimed in claim 29 wherein the transmitter comprises the means for signalling the data concerning the interleaving depth and interleaving method type to the receiver in a separate information block.

15 32. A transmitter as claimed in claim 29 wherein the transmitter comprises the means for signalling the data concerning the interleaving depth and interleaving method type to the receiver on a separate signalling channel.

33. A transmitter as claimed in any one of preceding claims wherein the transmitter comprises means for selecting the interleaving depth and interleaving method type according to the quality of the symbol block load.

20 34. A transmitter as claimed in any one of preceding claims wherein the transmitter comprises the means for changing the interleaving depth and interleaving method type on the basis of the measurements carried out on the transmission channel.

25 35. A transmitter as claimed in any one of preceding claims wherein the transmitter comprises means for changing the interleaving depth and interleaving method type on the basis of a coding method.

36. A transmitter as claimed in any one of preceding claims wherein the transmitter comprises the means for changing the interleaving depth and interleaving method type during retransmission of packet-mode data.

30 37. A transmitter as claimed in any one of preceding claims wherein the transmitter comprises the means for selecting the interleaving depth and interleaving method type so as to provide a changing point for an interleaving set, when all the symbol blocks are entirely sent whose transmission is initiated before said changing point of the interleaving set.

38. A transmitter as claimed in claim 37 wherein the transmitter comprises means for changing a modulation method at the provided changing point of the interleaving set.

5 39. A transmitter as claimed in claim 37 wherein the transmitter comprises the means for creating the changing point of the interleaving set in the beginning or at the end of a transmission turn.

40. A transmitter as claimed in claim 37 wherein the transmitter comprises means for selecting the receiver of the transmission at the provided changing point of the interleaving set.

10 41. A transmitter as claimed in claim 40 wherein the transmitter comprises the means for changing the receiver by directing the antenna beams of the transmitter.

42. A transmitter as claimed in claim 40 wherein the transmitter comprises the means for adjusting transmission power when changing the receiver of the transmission.

15 43. A transmitter as claimed in claim 29 wherein the transmitter is located in a subscriber terminal.

44. A transmitter as claimed in claim 29 wherein the transmitter is located in a network part of the radio system.

20 45. A transmitter as claimed in claim 29 wherein the transmitter is located in a control part of the radio system.

46. A radio receiver in which symbol blocks including bits are de-interleaved in order to improve the performance of a radio system, comprising means for receiving and interpreting signalling data concerning the symbol block-specific interleaving depth and interleaving method type of the received symbol blocks, and

25 means for removing the symbol block-specific interleaving of the symbol blocks using de-interleaving.

47. A receiver as claimed in claim 46 wherein the receiver is located in a subscriber terminal.

30 48. A receiver as claimed in claim 46 wherein the receiver is located in a network part of the radio system.

49. A receiver as claimed in claim 46 wherein the receiver is located in a control part of the radio system.